Potential Energy Curves and Functions

1. A 3 kg object is moving along the x-axis in a region where its potential energy as a function of time is given as U(x) = 4.0 x2, where U is in Joules and x is in meters. When the object passes the point x = -0.50m, its velocity is +2m/s. All forces acting on the object are conservative.
2. Calculate the total mechanical energy of the object
3. Calculate the x-coordinate of any points at which the object has zero kinetic energy.
4. An object of mass 0.5 kg experiences a force that is associated with the potential energy function U(x) = 4.0/(2.0 + x), where U is in Joules and x is in meters.
5. On the axes below, sketch the graph U(x) versus x.

U(J) 3

2

1

0 1 2 3 4 5 x(m)

1. Determine the force associated with the potential energy function given above.
2. Suppose that the object is released from rest at the origin. Determine the speed of the particle at x = 2m.